To:
GS/ Office of General Counsel
Rules Docket Clerk (Room 5218)
U.S. Department of Housing and Urban Development
451 7th St. SW
Washington, D.C., 20410-0500

Joint Comments on
Adoption of Energy Efficiency Standards for New Construction of HUD- and USDA-Financed Housing:
Preliminary Determination

Docket FR–6271–N–01

August 7, 2023

Thank you for the opportunity to comment on the preliminary determination to update energy efficiency requirements for federally financed housing. The undersigned organizations urge you

1. To finalize and implement the proposed determination with strict monitoring and enforcement
2. To take precautions to ensure unintended consequences do not harm residents, and
3. Take immediate action to assess and adopt subsequent codes that will make new construction of HUD and USDA (Departments) homes all-electric, highly efficient, healthy, and affordable.

Introduction:
Even as the nation is grappling with an affordability crisis, HUD and USDA provide much needed new and affordable homes that house the lowest income residents of the country. HUD programs subsidize 73% of US housing units considered affordable to extremely low income residents with about two-thirds of residents identifying as Black, Indigenous or other people of color.[1] Further, about 300,000 HUD units are at risk of having expired affordability restrictions in the next few years.[2] By expediting adoption of the proposed determination and assessing and adopting a more stringent code, the Departments will reduce energy burden and make homes more safe, healthy and resilient, especially for those communities who have historically suffered from the consequences of discriminatory housing policies.

[1] HUD Office of Policy Development and Research. "Picture of Subsidized Households." Accessed July 1 2023. https://www.huduser.gov/portal/datasets/assthsg.html
[2] National Low Income Housing Coalition. "The Gap: A Shortage of Affordable Homes." March 2023. https://nlihc.org/sites/default/files/gap/Gap-Report_2023.pdf

1. **Expedite Adoption of Proposed Determination:**

The Departments' potential adoption of the 2021 International Energy Conservation Code (IECC) and ASHRAE 90.1-2019 (proposed standards) constitutes a meaningful step toward greater energy affordability and healthy buildings. It is also long overdue: not only did the last update occur eight years ago, it also, unfortunately, updated standards to a set of already-outdated codes, the 2009 IECC and ASHRAE 90.1-2007. We applaud the Departments for proposing to adopt more current standards in this update.

The proposed standards will deliver major direct benefits to the Departments' residents as well as broader societal benefits. The Departments' preliminary determination suggests that $1.19 billion could be saved over the life cycle of units built during the first year following adoption of the proposed codes, considering both first cost and utility cost changes. In the 18 states whose commercial and high-rise codes are currently equivalent to or less stringent than ASHRAE 90.1-2007, the energy costs and greenhouse gas emissions associated with new units will fall by as much as 33% if the proposed codes are adopted. In the considerable majority of states (36 total) whose single-family and low-rise codes do not exceed IECC 2009, the proposed codes would result in savings of up to 27%.[3] The latter group of states includes high-volume HUD and USDA housing states such as Florida, Virginia, North Carolina, South Carolina, Georgia, Alabama, Arizona, and Tennessee.

HUD must ensure that the benefits of the proposed standards do not come at the expense of resident health. Updated energy codes require more tightly sealed building envelopes, and if not accompanied by appropriate and well maintained ventilation, tight buildings may create the risk of moisture retention and mold, accumulation of indoor air pollutants from construction materials offgassing, and other causes of building-related illness or "sick building syndrome." To avoid this outcome, HUD should fully fund and vigorously implement time-of-construction inspections to enforce ventilation requirements, such as ASHRAE 62.1 and 62.2, as well as ongoing NSPIRE inspections and deficiency resolution across programs. HUD should also consider requiring buildings to create Smoke Readiness Plans in alignment with ASHRAE Guideline 44p so that when outdoor air contains high levels of harmful pollutants, building managers can take swift action to protect residents.[4]

Similarly, HUD should ensure residents' living expenses, inclusive of housing and utility costs, do not rise due to the adoption of the proposed standards. In areas where fuel cost differences may result in more efficient buildings experiencing higher utility bills, residents should be

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[3] DOE's Building Energy Codes Program (BECP). "Historical Model Code Improvement" March 2022. ttps://public.tableau.com/app/profile/doebecp/viz/HistoricalModelEnergyCodeImprovement/CombinedHistoricalCodeImprovement_1

[4] Tom Javins et al. "Protecting Building Occupants From Smoke During Wildfire and Prescribed Burn Events." ASHRAE Journal. March 2021. https://www.epa.gov/sites/default/files/2021-05/documents/ashrae_journal_article_march_2021-tagged.pdf

protected from those cost increases. HUD should also carefully examine new construction proposals to ensure developers avoid increasing resident expenses due to changes in code requirements; while ASHRAE 90.1-2019 has been shown to reduce in very short and sometimes immediate payback periods compared to current standards, a risk remains that for buildings meeting 2021 IECC or less scrupulous developers, costs may still shift toward residents.

If appropriately implemented, enforced, monitored, and considered across other Department policy, the proposed standards will yield more affordable, comfortable, resilient, and healthy homes. The Departments must adopt the 2021 IECC and ASHRAE 90.1-2019 expeditiously, forgoing any further unnecessary delay.

2. Assess and Adopt All-electric New Construction Codes as Soon as Possible

Once the Departments adopt the proposed standards, they must assess and adopt a zero-combustion, all-electric standard as soon as possible to ensure that the Departments' low-income homeowners and residents are prioritized in a climate-aligned future. Fortunately, this opportunity is fast approaching, as the 2024 IECC is expected to be published early next year and will almost certainly include appendices that meet zero-energy and zero-emission goals. According to analyses of the draft 2024 IECC and final ASHRAE 90.1-2022, HUD and USDA owners and residents could see savings of 8[5] to 15[6] percent in total energy costs if the Departments took the initiative to adopt those standards.[7] If zero-energy and zero-emission appendices were included in the next update, the Departments would unlock greater savings potential and major health benefits stemming from access to efficient cooling and improved air quality. It would also be consistent with the administration's initiative to advance building codes to improve climate resilience and reduce energy costs.[8] The absence of such an initiative puts the most vulnerable and energy burdened population further at risk of uncomfortable homes and increased climate change vulnerability.

a. HUD and USDA have Legal Authority to Adopt Stronger Codes

The Departments have the authority to adopt energy codes that will drive even greater cost, health, and climate benefits and should exercise it as soon as possible.[9] Title 42

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[5] Pacific Northwest National Laboratory. "Energy Savings Analysis 2024 Residential IECC Interim Progress Indicator." 2022.
https://www.iccsafe.org/wp-content/uploads/2024-IECC-Interim-Residential-Progress-Indicator-to-ICC.pdf
[6] Pacific Northwest National Laboratory. "Energy Savings Analysis of ANSI/ASHRAE/IES Standard 90.1-2022 - Final Progress Indicator." February 2023.
[7] Note, however, that some trade-off allowances in the draft 2024 IECC for residential buildings may pose lifetime energy use and GHG emission increase risks. The Departments should seek the advice of energy code experts to ensure these elements of the 2024 IECC do not inadvertently undermine their adopted standards.
[8] The White House. "FACT SHEET: Biden-Harris Administration Launches Initiative to Modernize Building Codes, Improve Climate Resilience, and Reduce Energy Costs." Briefing room release. June 2022.
https://www.whitehouse.gov/briefing-room/statements-releases/2022/06/01/fact-sheet-biden-harris-administration-launches-initiative-to-modernize-building-codes-improve-climate-resilience-and-reduce-energy-costs/
[9] 42 U.S. Code § 12709(c) - Energy efficiency standards https://www.law.cornell.edu/uscode/text/42/12709

Subsection c of the U.S. Code outlines that HUD and USDA have the legal authority to establish and adopt any standards that meet or exceed IECC or ASHRAE. In fact, when IECC or ASHRAE release revised standards, the Departments must adopt codes at least as stringent within a year unless the Secretaries make a non-arbitrary determination that the new standards would not significantly improve energy efficiency, would not be technologically feasible, or would not be economically justified.[10] If the Departments fail to update the codes within one year of an IECC or ASHRAE update, the latest standards will apply to new construction and rehabilitated housing controlled by the Departments so long as the Secretaries determine that the revised codes will not negatively impact availability or affordability of new construction of homes subject to federally insured mortgages.[11]

This effort need not be administratively burdensome. By adopting the optional zero-emission and zero-energy appendices of the 2024 IECC and adapting them to amend ASHRAE 90.1-2022, the departments can easily establish a zero combustion code. The current public comment draft of the 2024 IECC for single-family and low-rise multifamily new construction, which will be finalized and published in early 2024, includes an All-Electric Appendix and a Zero-Energy Appendix.[12] It has been heavily vetted by an international community of code and construction experts. Similarly, for mid- and high-rise multifamily, ASHRAE 90.1-2022 is already published and available. IECC 2024 for commercial buildings' All-Electric Appendix[13] could easily be adapted for use with ASHRAE 90.1-2022, as the codes are deliberately designed in tandem to use similar methods and achieve similar efficiency levels.

With the Departments' adoption of IECC 2021 and ASHRAE 90.1-2019, HUD will take an important step toward the nation's energy efficiency goals. However, additional steps must be taken to realize the significant health, financial, and environmental benefits attributable to the most efficient codes. Accordingly, as soon as the IECC 2024 standards are finalized, HUD should use its authority under 42 U.S.C. § 12709(c) to require that covered construction and rehabilitation projects comply with the zero-energy, zero-emissions, and all-electric appendices to IECC 2024 as well as ASHRAE 90.1-2022. Over 100 jurisdictions in the country, most of which have high construction costs, already have all-electric new construction codes or laws.[14] As additional jurisdictions, such as New York State and Illinois, adopt statewide or stretch energy codes incorporating 2024

[10] *Id.*
[11] *Id.* § 12709(d).
[12] International Code Council. "The International Energy Conservation Code-Residential Proposed Legislative Changes to Public Comment Draft #1 Based on Committee Action Report." May 2023.
[13] International Code Council. "The International Energy Conservation Code-Commercial Proposed Legislative Changes to Public Comment Draft #1 Based on Committee Action Report." May 2023.
[14] The Building Decarbonization Coalition. "Zero Emission Building Ordinances." Accessed Jul 3 2023 https://buildingdecarb.org/zeb-ordinances

IECC language, the Departments should refer to those codes and adopt standards that harmonize to existing rules to the greatest extent practicable. Signatories to this letter, specifically RMI, could provide technical and analytical support to the department's efforts to assess and adopt all-electric codes.

b. All-Electric Homes Provide Health Benefits

Highly efficient, all-electric homes have proven health benefits. Gas appliances like water heaters, furnaces, fireplaces, and clothing dryers emit combustion pollutants that are vented outdoors, worsening air quality, especially for frontline communities that already experience disproportionately high pollutant loads. Further, gas stoves emit hazardous air pollution directly into homes, contributing to respiratory ailments and even cancer. These risks are elevated in small homes, especially those that lack adequate ventilation.

Burning fuels like gas, oil, wood, and biomass releases a plethora of pollutants, including carbon dioxide, nitrogen dioxide, carbon monoxide, particulate matter, and volatile organic compounds. Most combustion-fueled household appliances vent these pollutants to the outdoors, where they threaten the respiratory and cardiac health of the general public. Combustion pollutants from buildings led to approximately 18,300 early deaths and $205 billion in health impacts nationally in 2017 alone.[15] Alongside increased risk for heart and lung issues, appliance pollution reacts in the atmosphere to form harmful secondary pollutants like ground-level ozone and fine particulate matter, which contribute significantly to nonattainment with the Environmental Protection Agency (EPA)'s National Ambient Air Quality Standards (NAAQS).[16]

Outdoor air pollution from combustion appliances impacts everyone's health,[17] but communities of color in particular bear an alarming and disproportionate share of the health and pollution burdens from fossil fuel appliances. A recent peer-reviewed study found that people of color are exposed to twice as much outdoor $PM_{2.5}$ pollution from residential gas combustion as white people.[18] Residential gas combustion showed the highest relative racial-ethnic disparity of any of the 14 source categories studied—more than power plants, vehicles, and industrial sources.

Indoors, it is well understood that gas stoves emit pollutants including nitrogen dioxide (NO_2), carbon monoxide (CO), fine particulate matter ($PM_{2.5}$), benzene, and

[15] Brady Seals and Leah Louis-Prescott. "Uncovering the Deadly Toll of Air Pollution from Buildings." RMI. May 2021. https://rmi.org/uncovering-the-deadly-toll-of-air-pollution-from-buildings/

[16] United States Environmental Protection Agency (EPA). "Nonattainment Areas for Criteria Pollutants (Green Book)." June 2023. https://www.epa.gov/green-book

[17] Jim Dennison, Leah Louis-Prescott, and Talor Grunwald. "How Air Agencies Can Help End Fossil Fuel Pollution from Buildings." 2021. https://rmi.org/insight/outdoor-air-quality-brief/

[18] Christopher W. Tessum et al., PM2.5 polluters disproportionately and systemically affect people of color in the United States. Sci. Adv.7, eabf4491 (2021). DOI:10.1126/sciadv.abf4491

formaldehyde.[19] In fact, gas stoves can emit elevated indoor NO_2 at levels often exceeding both indoor guidelines and outdoor standards.[20] EPA has long recognized the associations between NO_2 and respiratory diseases.[21] In 2016, the EPA strengthened their assessment, determining that short-term exposure to NO_2 is "causal" of respiratory effects like asthma attacks and that long-term exposure to NO_2 is "likely causal" of respiratory effects like the development of asthma.[22] According to recent studies, 12.7% of childhood asthma cases in the United States are attributable to the use of gas stoves in households.[23] Additionally, children residing in homes with gas stoves have a 42% higher likelihood of developing asthma symptoms.[24] Children in low income neighborhoods are more at risk as they often spend more time indoors due to limited access to parks, playgrounds, and recreational programs, resulting in elevated exposure to poor indoor air quality.[25]

Like outdoor pollution , indoor air pollution from gas stoves disproportionately impacts lower-income households. Housing is closely linked to socioeconomic status, and factors including smaller unit size, more people inside the home (occupant density), and inadequate stovetop ventilation can contribute to elevated concentrations of NO_2 and other pollutants in lower-income multifamily buildings.[26] Use of range hoods may be even lower for low-income households than the population as a whole.[27] People who already have asthma are at increased risk of health effects from exposure to pollution; black people face the highest risk of asthma and higher mortality rates from asthma compared to white people.[28]

Earlier this year, WE ACT for Environmental Justice released "Out of Gas, In With Justice: Studying the Impacts of Induction Stoves on Indoor Air Quality in Affordable Housing, " a first of its kind study to examine carbon monoxide (CO) and nitrogen

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[19] Brady Seals and Andee Krasner. "Gas Stoves: Health and Air Quality Impacts and Solutions." 2020. https://rmi.org/insight/gas-stoves-pollution-health/

[20] ibid.

[21] US EPA. "Indoor airPLUS and Asthma." June 2023. https://www.epa.gov/indoorairplus/indoor-airplus-and-asthma

[22] US EPA. Integrated Science Assessment (ISA) for Oxides of Nitrogen – Health Criteria (Final Report, Jan 2016). US Environmental Protection Agency, Washington, DC, EPA/600/R-15/068, 2016.

[23] Talor Gruenwald et al., Population Attributable Fraction of Gas Stoves and Childhood Asthma in the United States, 20 Int'l J. of Env't Rsch. & Pub. Health 3 (Dec. 21, 2023).

[24] Lin Weiwei, et al., Meta-Analysis of the Effects of Indoor Nitrogen Dioxide and Gas Cooking on Asthma and Wheeze in Children, 42 Int'l J. of Epidemiology 1724-37 (2013).

[25] Price JH, Khubchandani J, McKinney M, Braun R. Racial/ethnic disparities in chronic diseases of youths and access to health care in the United States. Biomed Res Int. (2013):787616. doi:10.1155/2013/787616

[26] Adamkiewicz G, Zota AR, Fabian MP, et al. Moving environmental justice indoors: understanding structural influences on residential exposure patterns in low-income communities. Am J Public Health. 2011; 101 Suppl 1 (Suppl 1):S238-S245. doi:10.2105/AJPH.2011.300119

[27] Zhao H, Chan WR, Delp WW, Tang H, Walker IS, Singer BC. Factors Impacting Range Hood Use in California Houses and Low-Income Apartments. Int J Environ Res Public Health. 2020; 17(23):8870. Published 2020 Nov 28. doi:10.3390/ijerph17238870

[28] Centers for Disease Control. Asthma Surveillance. September 2021. https://stacks.cdc.gov/view/cdc/109086

dioxide (NO2) emissions from gas and induction stoves in inhabited apartments in federally funded public housing. The study found significant improvements to indoor air quality following the replacement of gas stoves with electric induction stoves.[29] During controlled cooking tests (CCTs), researchers found NO2 concentrations in apartments using gas stoves were 190% higher than in apartments using electric induction stoves. Further, households with electric induction stoves experienced an overall 35% reduction in daily NO_2 concentrations and a nearly 43% reduction in daily carbon monoxide concentrations compared to those still using gas stoves. During focus groups, participants reported anecdotal health improvements as a result of the transition. For example, one individual noted that using her gas stove would exacerbate her asthma and cause her to cough. She noticed those symptoms are gone now that she is using an induction stove, bringing her great relief and comfort. Another older participant went to the emergency room after she became ill following a gas leak in her apartment. She not only loves her induction stove because of its quality for cooking, but also because of the indoor air quality improvements she has experienced.

c. All-Electric Homes mitigate extreme weather events

Extreme weather events including wildfires and extreme heat and cold have led to increasing deaths around the country. Extreme heat is the number one weather-related cause of death in the US, claiming approximately 1,300 lives a year according to the EPA.[30] Extreme heat is becoming more hazardous, especially in areas of the country where air conditioning has long been viewed as a luxury, and in communities who may not be able to afford it. HUD housing has been particularly associated with less tree canopy, a need for improved air quality and mitigating climate vulnerability.[31] These factors are present in low-income and majority-Black neighborhoods, where public housing is often sited, in large part because of the legacy of redlining and the subsequent lack of investments in such neighborhoods.[32]

Electric heat pumps are a cost-effective technology capable of providing both heating *and* cooling, making them an effective protection against the effects of hotter summer temperatures and frequent, prolonged heat waves.[33] Across the country, very few habitability standards require cooling. By addressing this gap in standards, the

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[29] WE ACT for Environmental Justice. "Out of Gas, In With Justice: Studying the Impacts of Induction Stoves on Indoor Air Quality in Affordable Housing." February 2023. https://www.weact.org/campaigns/out-of-gas/

[30] US EPA. "Climate Change Indicators: Heat-Related Deaths." August 2022. https://www.epa.gov/climate-indicators/climate-change-indicators-heat-related-deaths

[31] C. J. Gabbe & Gregory Pierce (2020): Extreme Heat Vulnerability of Subsidized Housing Residents in California, Housing Policy Debate, May 2020.

[32] Jesdale, B.M., R. Morello-Frosch, and L. Cushing. (2013). The racial/ethnic distribution of heat risk-related land cover in relation to residential segregation. *Environmental Health Perspectives* 121(7):811–817. Available: http://doi.org/10.1289/ehp.1205919.

[33] Lacey Tan and Mohammad Hassan Fathollahzadeh. "Why Heat Pumps Are the Answer to Heat Waves." RMI. August 2021. https://rmi.org/why-heat-pumps-are-the-answer-to-heat-waves/

Departments can take decisive action towards keeping federally-assisted housing units safe for residents. Transitioning from the use of gas to electricity can also reduce the risks posed by gas distribution infrastructure, namely fires and explosions, at both a neighborhood and household level.[34]

d. Reduce utility, construction, and secondary costs

The Departments have a duty to reduce energy burden among their residents and owners. Low-income Americans pay about four times more for energy on an income-percentage basis than non-low-income Americans.[35] The scarce dollars in low-income residents' budgets are then unavailable for other critical needs, increasing the risk of cascading harms. Residents may resort to payday loans or other potentially predatory financial options to avoid losing access to heat and light,[36] or may forgo food or medical care.[37] Research on the effectiveness of the Weatherization Assistance Program has shown that energy efficiency improvements to the homes occupied by low-income residents create $4.50 in energy- and non-energy benefits for every $1 spent.[38] Since weatherization is relatively expensive compared to efficient new construction, the benefits per dollar spent on advanced energy standards for the Departments are likely even greater.

Zero-emission, high-efficiency codes will reduce energy use and energy costs compared to the Departments' proposed codes. The Pacific Northwest National Laboratory estimates that draft provisions of the 2024 IECC for single-family and low-rise residential buildings would reduce energy cost by 7.71% on average across climate zones,[39] while ASHRAE 90.1-2022 for mid- and high-rise multifamily buildings would reduce energy cost by 18.3% and 13.0%, respectively.[40] Requiring all-electric new construction could reduce energy costs further, especially due to the high efficiency of heat pumps, which typically halve energy use on heating compared to electric resistance furnaces or baseboard heat.[41] For example, an energy modeling study suggests that, across nine cities

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[34] Yu Ann Tan and Bomee Jung. "Decarbonizing Homes: Improving Health in Low-Income Communities through Beneficial Electrification." RMI. 2021. https://rmi.org/insight/decarbonizing-homes/

[35] Drehobl, A., L. Ross, and R. Ayala. 2020. How High Are Household Energy Burdens? Washington, DC: American Council for an Energy-Efficient Economy. https://www.aceee.org/research-report/u2006

[36] Levy, R. and Sledge, J. (2012) A Complex Portrait: An Examination of Small-Dollar Credit Consumers. Center for Financial Services Innovation.

[37] Energy Information Administration. "One in Three U.S. Households Faces a Challenge in Meeting Energy Needs." Today in Energy, September 2018. www.eia.gov/todayinenergy/detail.php?id=37072

[38] US Department of Energy Office of Energy Efficiency and Renewable Energy. "Weatherization Assistance Program Fact Sheet." January 2021. https://www.energy.gov/sites/default/files/2021/01/f82/WAP-fact-sheet_2021_0.pdf

[39] Pacific Northwest National Laboratory. "Energy Savings Analysis 2024 Residential IECC Interim Progress Indicator." 2022. https://www.iccsafe.org/wp-content/uploads/2024-IECC-Interim-Residential-Progress-Indicator-to-ICC.pdf

[40] Pacific Northwest National Laboratory. "Energy Savings Analysis of ANSI/ASHRAE/IES Standard 90.1-2022 - Final Progress Indicator." February 2023.

[41] United States Department of Energy. "Heat Pump Systems." Accessed July 3 2023. https://www.energy.gov/energysaver/heat-pump-systems

studied, all-electric new single-family homes cost 14% less to operate on average, and were less expensive to operate in every city studied.[42]

All-electric new construction is also frequently more affordable on a first-cost basis than mixed-fuel new construction because it excludes expensive gas plumbing and requires only one appliance for both space heating and cooling. For example, across nine cities, all-electric new single-family homes cost 5% less to build on average and were less expensive to build in every city studied.[43] Recent RMI analysis suggests that in climate zone 2, the incremental cost above IECC 2021 compliance to build an all-electric single-family home to the Zero-Energy Ready Home standard is 15% less than for a mixed-fuel home. In multifamily new construction, new construction of all-electric multifamily homes costs approximately $3300 less per unit than mixed-fuel construction in California.[44]

Continuing to install gas infrastructure in HUD-assisted housing and federally insured homes also risks trapping the nation's most financially-vulnerable residents in a utility death spiral.[45] As access to renewable energy technologies and high-efficiency electric appliances increases, customers will increasingly reduce their reliance on gas. The wealthiest customers will have the most freedom of choice to reduce and ultimately terminate their reliance on gas utilities, leaving the lowest-income and most energy burdened residents to bear the fixed costs of the gas distribution system. This shrinking rate base will face bill increases projected to exceed $100 on average by 2040 and continue to escalate as customers leave the gas system,[46] exacerbating high energy burden for low-income customers.

Conclusion:

We appreciate the Departments' thorough determination that proves that the 2021 IECC and ASHRAE 90.1-2019 offer greater efficiency without impacting the much needed production and preservation of affordable housing across the country. We support HUD and USDA adopting the proposed determination and urgently implore them to do so without further delay. Further, we recommend that the Departments act swiftly following this update to assess and adopt 2024 IECC and ASHRAE 90.1-2022 including appendices requiring highly efficient, all-electric new construction.

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[42] Lacey Tan, Mohammad Hassan Fathollahzadeh, and Edie Taylor. The Economics of Electrifying Buildings: Residential New Construction, RMI, 2022, https://rmi.org/insight/economics-of-electrifying-residential-new-construction/.

[43] ibid.

[44] Bruceri, M. (2019)."Draft 2019 Energy Efficiency Cost-effectiveness Study: Low Rise Residential." For PG&E Codes & Standards, prepared by Frontier Energy. March 15, 2019

[45] Davis, Lucas and Hausman, Catherine. 2022. "Who Will Pay for Legacy Utility Costs?" Journal of the Association of Environmental and Resource Economists, 9(6): 1047–1085.10.1086/719793

[46] ibid.

Sincerely,

Environmental Justice Organizations:

WE ACT for Environmental Justice
Alaska Community Action on Toxics
Coalition of Community Organizations
Dayton Energy Collaborative
Green & Healthy Homes Initiative, Inc
GreenLatinos
Midwest Building Decarbonization Coalition
Native Sun Community Power Development
New Liberty Road Community Development Corporation
PBC Green Team
South Bronx Unite
Texas Environmental Justice Advocacy Services
West End Revitalization Association WERA

Allied Organizations:

AjO
American Council for an Energy-Efficient Economy
Building Decarbonization Coalition
Building Electrification Institute
Climate + Energy Project
Climate Reality Project: Chicago Metro Chapter
Community Development Corporation of PHP
Dream.Org
Electrify DC
Evergreen Action
Greater Boston Physicians for Social Responsibility
Iowa Environmental Council
Just Solutions
Michigan Clinicians for Climate Action
New Yorkers for Clean Power
New York Geothermal Energy Organizations
NRDC (Natural Resources Defense Council)
ONE Northside
Public Health Law Center
Respiratory Health Association

Rewiring America
RMI
Sealed
Sierra Club
Slipstream
Union of Concerned Scientists
Wisdom’s Well llc
ZeroCarbonMA
350 Bay Area